

# TigerSwitch 10/100

## 24-Port 10/100 Managed Layer 3 Switch

- ◆ 24 10BASE-T/100BASE-TX auto MDI/MDI-X ports
- ◆ Optional 1000BASE-X or 100BASE-FX modules
- ◆ IP routing with RIP and OSPF
- ◆ 8.8 Gbps of aggregate bandwidth
- ◆ Non-blocking switching architecture
- ◆ Spanning Tree Protocol
- ◆ Up to six LACP or static 4-port trunks
- ◆ Port mirroring for non-intrusive analysis
- ◆ Layer 2/3/4 CoS support through four priority queues
- ◆ Full support for VLANs with GVRP
- ◆ IGMP and DVMRP multicast support
- ◆ Manageable via console, Web, SNMP/RMON





# **TigerSwitch 10/100 Installation Guide**

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From SMC's Tiger line of feature-rich workgroup LAN solutions

**SMC**<sup>®</sup>

**Networks**

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# COMPLIANCES

## FCC - Class A

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

You may use unshielded twisted-pair (UTP) cable for RJ-45 connections—Category 3 or greater for 10 Mbps connections, Category 5 for 100 Mbps connections, and Category 5, 5e, or 6 for 1000 Mbps. Use 50/125 or 62.5/125 micron multimode fiber optic cable, or 9/125 micron single-mode fiber optic cable, for SC or ST-type connections.

- Warnings:**
1. Wear an anti-static wrist strap or take other suitable measures to prevent electro-static discharge when handling this equipment.
  2. When connecting this switch to a power outlet, connect the field ground lead on the tri-pole power plug to a valid earth ground line to prevent electrical hazards.

## Industry Canada - Class A

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled “Digital Apparatus,” ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: “Appareils Numériques,” NMB-003 édictée par le ministère des Communications.

## EC Conformance Declaration - Class A

SMC contact for these products in Europe is:

SMC Networks Europe,  
Edificio Conata II,  
Calle Frutuós Gelabert 6-8, 2<sup>a</sup>, 4<sup>a</sup>,  
08970 - Sant Joan Despí, Barcelona, Spain.

This information technology equipment complies with the requirements of the Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied:

- RFI Emission:
- Limit class A according to EN 55022:1998
  - Limit class A for harmonic current emission according to EN 61000-3-2/1995
  - Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3/1995
- Immunity:
- Product family standard according to EN 55024:1998
  - Electrostatic Discharge according to EN 61000-4-2:1995 (Contact Discharge:  $\pm 4$  kV, Air Discharge:  $\pm 8$  kV)
  - Radio-frequency electromagnetic field according to EN 61000-4-3:1996 (80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m)
  - Electrical fast transient/burst according to EN 61000-4-4:1995 (AC/DC power supply:  $\pm 1$  kV, Data/Signal lines:  $\pm 0.5$  kV)
  - Surge immunity test according to EN 61000-4-5:1995 (AC/DC Line to Line:  $\pm 1$  kV, AC/DC Line to Earth:  $\pm 2$  kV)
  - Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m)
  - Power frequency magnetic field immunity test according to EN 61000-4-8:1993 (1 A/m at frequency 50 Hz)
  - Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994 (>95% Reduction @10 ms, 30% Reduction @500 ms, >95% Reduction @5000 ms)
- LVD:
- EN 60950 (A1/1992; A2/1993; A3/1993; A4/1995; A11/1997)

**Warning:** Do not plug a phone jack connector in the RJ-45 port. This may damage this device.  
Les raccordeurs ne sont pas utilisés pour le système téléphonique!



## Japan VCCI Class A

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## Australia AS/NZS 3548 (1995) - Class A



ACN 069 351 613

SMC contact for products in Australia is:

SMC Communications Pty. Ltd.

Suite 18, 12 Tryon Road,

Lindfield NSW2070,

Phone: 61-2-94160437

Fax: 61-2-94160474

Safety Compliance

Warning: Fiber Optic Port Safety



When using a fiber optic port, never look at the transmit laser while it is powered on. Also, never look directly at the fiber TX port and fiber cable ends when they are powered on.

Avertissement: Ports pour fibres optiques - sécurité sur le plan optique



Ne regardez jamais le laser tant qu'il est sous tension. Ne regardez jamais directement le port TX (Transmission) à fibres optiques et les embouts de câbles à fibres optiques tant qu'ils sont sous tension.

Warnhinweis: Faseroptikanschlüsse - Optische Sicherheit



Niemals ein Übertragungslaser betrachten, während dieses eingeschaltet ist. Niemals direkt auf den Faser-TX-Anschluß und auf die Faserkabelenden schauen, während diese eingeschaltet sind.

Underwriters Laboratories Compliance Statement

**Important!** Before making connections, make sure you have the correct cord set. Check it (read the label on the cable) against the following:

Operating Voltage	Cord Set Specifications
120 Volts	UL Listed/CSA Certified Cord Set
	Minimum 18 AWG
	Type SVT or SJT three conductor cord
	Maximum length of 15 feet
	Parallel blade, grounding type attachment plug rated 15 A, 125 V
240 Volts (Europe only)	Cord Set with H05VV-F cord having three conductors with minimum diameter of 0.75 mm <sup>2</sup>
	IEC-320 receptacle
	Male plug rated 10 A, 250 V

The unit automatically matches the connected input voltage. Therefore, no additional adjustments are necessary when connecting it to any input voltage within the range marked on the rear panel.

## Wichtige Sicherheitshinweise (Germany)

1. Bitte lesen Sie diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie keine Flüssigoder Aerosolreiniger. Am besten eignet sich ein angefeuchtetes Tuch zur Reinigung.
4. Die Netzanschlusßsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Beschädigungen hervorrufen.
7. Die Belüftungsöffnungen dienen der Luftzirkulation, die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen, die sich am Gerät befinden, sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von autorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
  - a. Netzkabel oder Netzstecker sind beschädigt.
  - b. Flüssigkeit ist in das Gerät eingedrungen.
  - c. Das Gerät war Feuchtigkeit ausgesetzt.
  - d. Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
  - e. Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
  - f. Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
15. Zum Netzanschluß dieses Gerätes ist eine geprüfte Leitung zu verwenden. Für einen Nennstrom bis 6 A und einem Gerätegewicht größer 3 kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0,75 mm<sup>2</sup> einzusetzen.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weniger.

## *COMPLIANCES*

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# CHAPTER 1

## ABOUT THE TIGERSWITCH 10/100

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### Overview

SMC's TigerSwitch 10/100 (SMC6724L3) is an intelligent multilayer switch with 24 10/100BASE-TX ports plus two slots on the front panel for slide-in modules (100BASE-FX, 1000BASE-T, or GBIC transceivers). There is also an SNMP-based management agent embedded on the main board. This agent supports both in-band and out-of-band access for managing the switch.

This switch can easily tame your network with full support for Spanning Tree Protocol, Multicast Switching, Virtual LANs, and IP routing. It brings order to poorly performing networks by segregating them into separate broadcast domains with IEEE 802.3Q compliant VLANs, empowers multimedia applications with multicast switching and CoS services, and eliminates conventional router bottlenecks.

It can be used to augment or completely replace slow legacy routers, off-loading local IP traffic to release valuable resources for non-IP routing or WAN access. With wire-speed performance for Layer 2, Layer 3 and Layer 4, this switch can significantly improve the throughput between IP segments or VLANs.

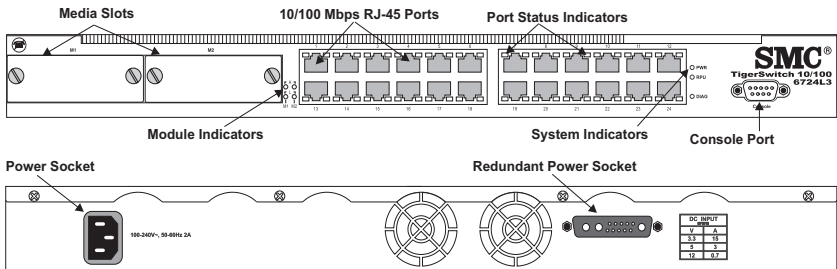


Figure 1-1. SMC6724L3 Front and Rear Panels

Switch Architecture

The switch employs a wire-speed, non-blocking switching fabric. This permits simultaneous wire-speed transport of multiple packets at low latency on all ports. This switch also features full-duplex capability on all ports, which effectively doubles the bandwidth of each connection.

Auto-negotiation is used to select the optimal transmission speed and communication mode for each connection. With store-and-forward switching and flow control, maximum data integrity is always maintained, even under heavy loading.

This switch includes two slots on the front panel for slide-in 1000BASE-T, 100BASE-FX, or 1000BASE-X (GBIC) modules. Cascade connections between switches can be made using these modules.

## Management Options

This switch contains a comprehensive array of LEDs for “at-a-glance” monitoring of network and port status. It also includes a management agent that allows you to configure or monitor the switch using its embedded management software, or via SNMP applications. To manage the switch, you can make a direct connection to the RS-232 console port (out-of-band), or you can manage the switch through a network connection (in-band) using Telnet, the on-board Web agent, or Windows-based network management software.

For a detailed description of the switch’s advanced features, refer to the Management Guide.

## Description of Hardware

### RJ-45 Ports

The switch base unit contains 24 10BASE-T/100BASE-TX RJ-45 ports. All of these ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. (See “10BASE-T/100BASE-TX Pin Assignments” on page B-2.)

Each of these ports support auto-negotiation, so the optimum transmission mode (half or full duplex), and data rate (10 or 100 Mbps) can be selected automatically. If a device connected to one of these ports does not support auto-negotiation, the communication mode of that port can be configured manually.

Each port also supports IEEE 802.3x auto-negotiation of flow control, so the switch can automatically prevent port buffers from becoming saturated.

## Ports Status LEDs

The LEDs, which are located on the front panel for easy viewing, are shown below and described in the following table.

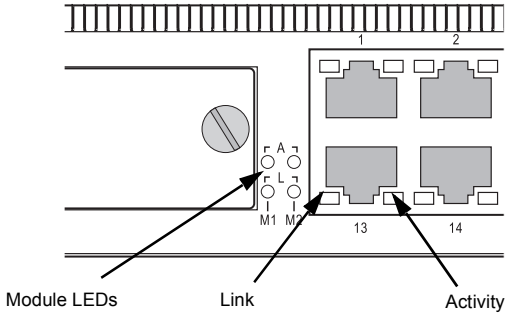


Figure 1-2. Port Status LEDs

Port and Status LEDs		
LED	Condition	Status
Base Unit Ports		
Link	On Green	Port has established a valid 100 Mbps network connection.
	Flashing Green	Port has established a valid 10 Mbps network connection.
Activity	Flashing Yellow	Traffic is passing through the port.
Module Ports		
Link	On Yellow	Port has established a valid 1000 Mbps network connection.
	On Green	Port has established a valid 100 Mbps network connection.
	Flashing Green	Port has established a valid 10 Mbps network connection.
	Flashing Yellow	Port disabled.
Activity	Flashing Green	Traffic is passing through the port.

System Status LEDs

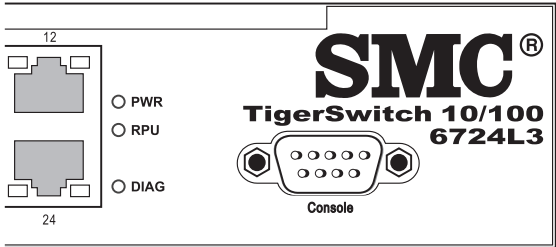
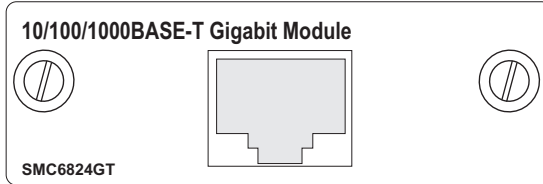


Figure 1-3. System Status LEDs

System Status LEDs		
LED	Condition	Status
PWR	On	Switch is receiving power.
	Off	Power off or failure.
RPU	On	The redundant power supply is operating normally.
	On Amber	The redundant power supply has failed.
	Off	No redundant power supply is connected.
Diag	On Green	The system diagnostic test has completed successfully.
	Flashing Green	The system diagnostic test is in progress.
	On Amber	The system diagnostic test has detected a fault.

## Optional Media Extender Modules

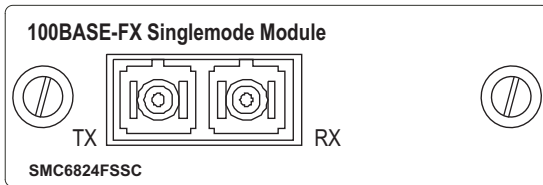
### Optional 10/100/1000BASE-T Module (SMC6824GT)



**Figure 1-4. Single-Port 1000BASE-T Gigabit Module**

Using Category 5, 5e, or 6 twisted-pair cable you can connect to another device up to 100 m (328 ft) away. The 1000BASE-T module operates at 10/100/1000 Mbps. At 1000 Mbps it operates at full duplex and supports auto-negotiation of speed and flow control. At 10/100 Mbps it supports auto-negotiation of speed, duplex mode (i.e., half or full duplex), and flow control. Note that you should first test the cable installation for IEEE 802.3ab compliance. See “1000BASE-T Cable Requirements” on page B-6.

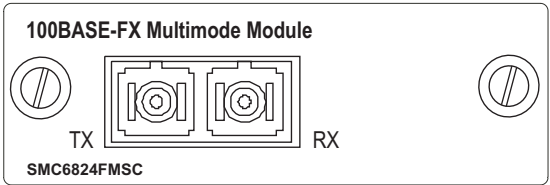
### Optional 100BASE-FX Module (SMC6824FSSC)



**Figure 1-5. Single-Port 100BASE-FX Single-Mode Module**

Using single-mode fiber optic cable, the 100BASE-FX port can be connected to a remote site up to 20 km (12.4 miles) away. The 100BASE-FX module operates at 100 Mbps, with support for full-duplex mode and flow control.

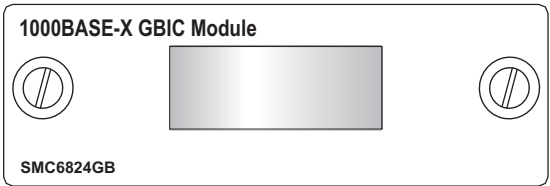
**Optional 100BASE-FX Module (SMC6824FMSC)**



**Figure 1-6. Single-Port 100BASE-FX Multimode Module**

Using multimode fiber optic cable, the 100BASE-FX port can be connected to a remote site up to 2 km (1.24 miles) away. The 100BASE-FX module is fixed to operate at 100 Mbps full duplex, and supports auto-negotiation for flow control. This module is fitted with an SC connector, but you can attach an ST plug to the switch using the SC-ST Converter (Part Number: 99-012034-091).

**Optional 1000BASE-X GBIC Module (SMC6824GB)**



**Figure 1-7. Single-Port 1000BASE-X GBIC Module**

This module supports 5V 1000BASE-SX, 1000BASE-LX and 1000BASE-ZX GBIC transceivers:

1000BASE-SX GBIC transceivers provide one short-wavelength (850 nm) Gigabit port that can be used for a high-speed backbone or server connection. This port can be connected to a site up to 220 m (722 ft) away with 62.5/125 micron multimode fiber cable, or up to 500 m (1641 ft) with 50/125 micron multimode fiber cable.

1000BASE-LX GBIC transceivers provide one long-wavelength (1300 nm) Gigabit port that can be used for a high-speed backbone or server



connection. This port can be connected to a site up to 5 km (16404 ft) away with single-mode fiber cable.

1000BASE-ZX GBIC transceivers provide one long-wavelength (1550 nm) Gigabit port that can be used for a long-haul connection to a remote location. This port can be connected to a site up to 100 km (62.1 miles) away with single-mode fiber cable.

**Caution:** Install only 5 V GBIC transceivers into the module slots.

## Optional Redundant Power Unit

An optional Redundant Power Unit (RPU) is available that can supply power to the switch in the event of failure of the internal power supply.

## Power Supply Receptacle

The power receptacle is located on the rear panel of the switch. The standard power receptacle is for the AC power cord. The receptacle labeled “RPU” is for the optional Redundant Power Unit (RPU).

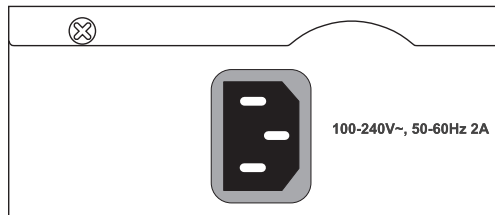


Figure 1-8. Power Supply Receptacle

## Features and Benefits

### Connectivity

- ◆ 24 dual-speed ports for easy Fast Ethernet integration and for protection of your investment in legacy LAN equipment.
- ◆ Auto-negotiation enables each RJ-45 port to automatically select the optimum communication mode (half or full duplex) if this feature is supported by the attached device; otherwise the port can be configured manually.
- ◆ Independent RJ-45 10/100BASE-TX ports with auto MDI/MDI-X pinout selection.
- ◆ Unshielded (UTP) cable supported on all RJ-45 ports: Category 3, 4 or 5 for 10 Mbps connections and Category 5 or 5e for 100 Mbps connections.
- ◆ IEEE 802.3 Ethernet, 802.3u Fast Ethernet, 802.3z and 802.3ab Gigabit Ethernet compliance ensures compatibility with standards-based hubs, network cards and switches from any vendor.

### Expandability

- ◆ Optional single-port 100BASE-FX modules that can run up to 2 km (using 62.5/125 or 50/125 micron, multimode fiber cable), or 20 km (using 9/125 micron single-mode fiber cable) and operate at 100 Mbps, full duplex, with auto-negotiation for flow control.
- ◆ Optional single-port 1000BASE-T Gigabit module that can run up to 100 meters (using 100-ohm Category 5, 5e or 6 unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable), and operates at 1 Gbps, full duplex, with auto-negotiation for flow control.
- ◆ Optional single-port 1000BASE-X GBIC module that supports a single-port 1000BASE-SX, 1000BASE-LX, or 1000BASE-LH GBIC transceiver, and operates at 1 Gbps, full duplex, with auto-negotiation for flow control.

## **Performance**

- ◆ Transparent bridging
- ◆ Aggregate bandwidth of up to 8.8 Gbps
- ◆ Switching table with a total of 8K MAC address entries and 2K IP address entries
- ◆ Provides store-and-forward switching for intra-VLAN traffic, and IP routing for inter-VLAN traffic
- ◆ Supports wire-speed switching at Layer 2, and wire-speed routing at Layer 3
- ◆ Supports flow control, using back pressure for half duplex and IEEE 802.3x for full duplex
- ◆ Broadcast storm control
- ◆ Desktop or rack-mountable

## **Management**

- ◆ “At-a-glance” LEDs for easy troubleshooting
- ◆ Management agent:
  - Manages switch in-band or out-of-band
  - Supports Telnet, SNMP/RMON and Web-based interface



# CHAPTER 2

## NETWORK PLANNING

---

### Introduction to Switching

A network switch allows simultaneous transmission of multiple packets via non-crossbar switching. This means that it can partition a network more efficiently than bridges or routers. The switch has, therefore, been recognized as one of the most important building blocks for today's networking technology.

When performance bottlenecks are caused by congestion at the network access point (such as the network card for a high-volume file server), the device experiencing congestion (server, power user or hub) can be attached directly to a switched port. And, by using full-duplex mode, the bandwidth of the dedicated segment can be doubled to maximize throughput.

When networks are based on repeater (hub) technology, the maximum distance between end stations is limited. For Ethernet, there may be up to four hubs between any pair of stations; for Fast Ethernet, the maximum is two. This is known as the hop count. However, a switch turns the hop count back to zero. So subdividing the network into smaller and more manageable segments, and linking them to the larger network by means of a switch, removes this limitation.

A switch can be easily configured in any Ethernet or Fast Ethernet network to significantly boost bandwidth while using conventional cabling and network cards.

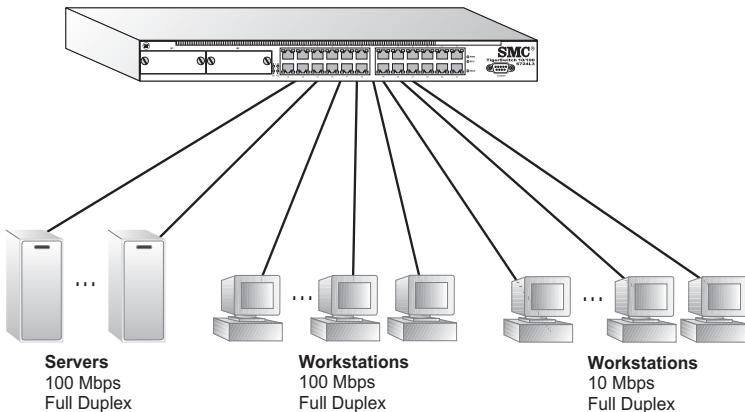
## Application Examples

The TigerSwitch 10/100 is not only designed to segment your network, but also to provide a wide range of options in setting up network connections. Some typical applications are described below.

### Collapsed Backbone

The TigerSwitch 10/100 is an excellent choice for mixed Ethernet and Fast Ethernet installations where significant growth is expected in the near future. You can easily build on this basic configuration, adding direct full-duplex connections to workstations or servers. When the time comes for further expansion, just cascade the switch to another Ethernet or Fast Ethernet switch, or link to another workgroup using a Gigabit connection.

In the figure below, the switch is operating as a collapsed backbone for a small LAN. It is providing dedicated 10 Mbps full-duplex connections to workstations and 100 Mbps full-duplex connections to power users and servers.



**Figure 2-1. Collapsed Backbone**

## Central Wiring Closet

With 26 parallel bridging ports (i.e., 26 distinct collision domains), this switch can collapse a complex network down into a single efficient bridged node, increasing overall bandwidth and throughput.

In the figure below, the 10BASE-T/100BASE-TX ports on the switch are providing 100 Mbps connectivity for up to 24 segments. In addition, the switch is also connecting servers at 100 Mbps.

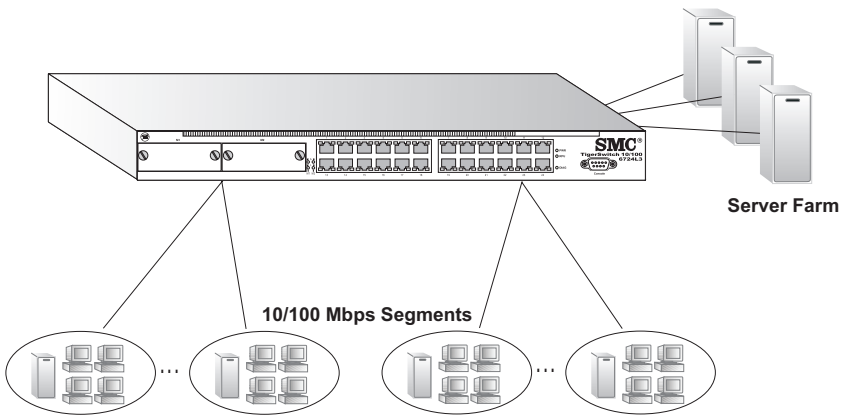


Figure 2-2. Central Wiring Closet

## Remote Connection with Fiber Cable

Fiber optic technology allows for longer cabling than any other media type. A 100 Mbps multimode fiber (MMF) link can run up to 2 km, and a 100 Mbps single-mode fiber (SMF) link can run as far as 20 km. A 1000BASE-SX (MMF) link can connect to a site up to 550 meters away, and a 1000BASE-ZX (SMF) link can run up to 100 km. This allows the Fast Ethernet Routing Switch to serve as a collapsed backbone, providing direct connectivity for a widespread LAN.

The 100BASE-FX (SMF) plug-in module or 1000BASE-ZX GBIC module can be used to interconnect remote network segments. While a 1000BASE-SX module can be used for a high-speed connection between floors in the same building, and a 1000BASE-LX module can be used to connect to other buildings in a campus setting.

The figure below illustrates this switch connecting multiple segments with fiber cable.

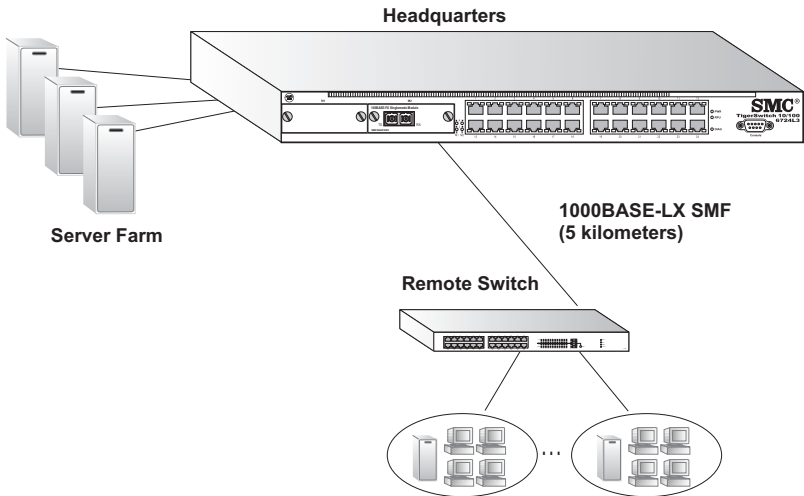


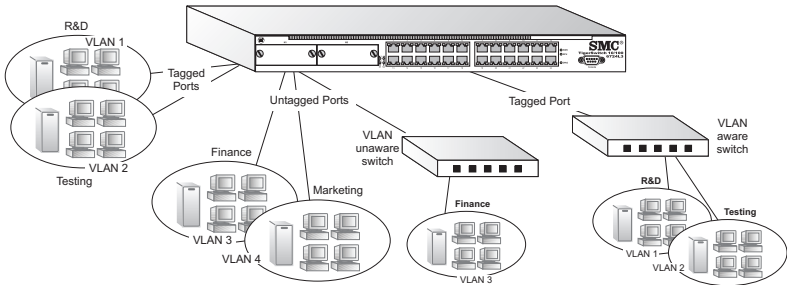
Figure 2-3. Remote Connection with Fiber Cable



## Making VLAN Connections

VLANs can be based on untagged port groups, or each data frame can be explicitly tagged to identify the VLAN group it belongs to. When using port-based VLANs, ports can either be assigned to one specific group or to all groups. Port-based VLANs are suitable for small networks. A single switch can be easily configured to support several VLAN groups for various organizational entities (such as Finance and Marketing).

When you expand port-based VLANs across several switches, you need to make a separate connection for each VLAN group. This approach is, however, inconsistent with the Spanning Tree Protocol, which can easily segregate ports that belong to the same VLAN. When VLANs cross separate switches, it is therefore better to use VLAN tagging. This allows you to assign multiple VLAN groups to the “trunk” ports (that is, tagged ports) connecting different switches.

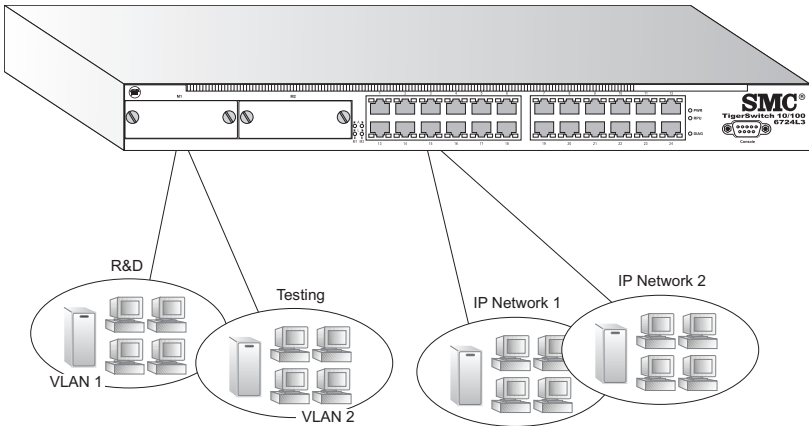


**Figure 2-4. Making VLAN Connections**

**Note:** When connecting to a switch that does not support IEEE 802.1Q VLAN tags, use untagged ports.

## Using Layer 3 Routing

VLANs can significantly enhance network performance and security. However, if you use conventional routers to interconnect VLANs, you can lose most of your performance advantage. The TigerSwitch 10/100 provides wire-speed routing, which allows you to eliminate your conventional IP routers, except for a router to handle non-IP protocols and a gateway router linked to the WAN. Just assign an IP address to any VLANs that need to communicate. The switch will continue to segregate Layer 2 traffic based on VLANs, but will now provide inter-VLAN connections for IP applications. This switch will perform IP routing for specified VLAN groups, a directly connected subnetwork, a remote IP subnetwork or host address, a subnetwork broadcast address, a switch IP address on a specific IP subnetwork, or an IP multicast address.



**Figure 2-5. IP Routing for Unicast Traffic**

# Connectivity Rules

When adding hubs (repeaters) to your network, please follow the standard connectivity rules for Ethernet or Fast Ethernet. However, note that because switches break up the path for connected devices into separate collision domains, you should not include the switch or connected cabling in your calculations for cascade length involving other devices.

## 1000 Mbps Gigabit Ethernet Collision Domain

Maximum Fiber Optic Cable Distance for 1000BASE-SX		
Fiber Size	Fiber Bandwidth	Maximum Cable Length
62.5/125 micron	160 MHz/km	2-220 m (7-722 ft)
	200 MHz/km	2-275 m (7-902 ft)
50/125 micron	400 MHz/km	2-500 m (7-1641 ft)
	500 MHz/km	2-550 m (7-1805 ft)

Maximum Fiber Optic Cable Distance for 1000BASE-LX		
Fiber Size	Fiber Bandwidth	Maximum Cable Length
9/125 micron	N/A	2 m - 10 km (7 - 32808 ft)

Maximum Cable Distance for 1000BASE-T		
Type	Connector	Maximum Cable Length
Cat. 5, 5e, or 6 100-ohm UTP	RJ-45	100 m (328 ft)

Maximum 1000BASE-ZX Fiber Optic Cable Distance		
Fiber Diameter	Fiber Bandwidth	Cable Length Range
9/125 micron single-mode fiber (SMF)	N/A	70* - 100 km (43.5 - 62.1 miles)

\* For link spans exceeding 70 km, you may need to use premium single mode fiber or dispersion shifted single mode fiber.

**10/100 Mbps Ethernet Collision Domain**

<b>Maximum 10/100 Mbps Ethernet Cable Distance</b>		
<b>Type</b>	<b>Cable Type</b>	<b>Max. Cable Length</b>
10BASE-T	Twisted Pair, Category 3 or better	100 m (328 ft)
100BASE-TX	Category 5 or better 100-ohm UTP or STP	100 m (328 ft)
100BASE-FX Multimode	50/125 or 62.5/125 micron core multimode fiber (MMF)	2 km (1.24 miles)
100BASE-FX Single-Mode	9/125 micron core single-mode fiber (SMF)	20 km (12.43 miles)

## Application Notes

1. Full-duplex operation only applies to point-to-point access (such as when a switch is attached to a workstation, server or another switch). When the switch is connected to a hub, both devices must operate in half-duplex mode.
2. Avoid using flow control on a port connected to a hub unless it is actually required to solve a problem. Otherwise back pressure jamming signals may degrade overall performance for the segment attached to the hub.
3. For network applications that require routing between dissimilar network types, you can attach the TigerSwitch 10/100 units directly to a multi-protocol router. However, if you have to interconnect distinct VLANs or IP subnets, you can take advantage of the wire-speed Layer 3 routing provided by this switch.
4. The multimode fiber modules are fitted with SC connectors, but you can attach an ST plug to the switch using an SC-to-ST plug converter. If you do use an ST plug converter, be sure you run cable from the Rx (Tx) port on the module to the Tx (Rx) port on the target device.
5. As a general rule:
  - the length of Gigabit fiber optic cable for a single switched link should not exceed 550 m (1805 ft) for 1000BASE-SX multimode fiber or 5 km (16404 ft) for 1000BASE-LX single-mode fiber.
  - the length of 100BASE-FX fiber optic cable for a single switched link should not exceed 2 km (1.24 miles) for multimode fiber or 20 km (2.43 miles) for single-mode fiber.

However, power budget constraints must also be considered when calculating the maximum cable length for your specific environment.



# CHAPTER 3

## INSTALLING THE SWITCH

---

### Selecting a Site

TigerSwitch 10/100 units can be mounted in a standard 19-inch equipment rack or on a flat surface. Be sure to follow the guidelines below when choosing a location.

- ◆ The site should:
  - be at the center of all the devices you want to link and near a power outlet.
  - be able to maintain its temperature within 0° to 50° C (32 to 122° F) and its humidity within 10% to 90%, non-condensing
  - provide adequate space (approximately two inches) on all sides for proper air flow
  - be accessible for installing, cabling and maintaining the devices
  - allow the status LEDs to be clearly visible
- ◆ Make sure twisted-pair cable is always routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference, such as radios, transmitters, etc.
- ◆ Make sure that a separate grounded power outlet that provides 100 to 240 VAC, 50 to 60 Hz, is within 2.44 m (8 feet) of each device and is powered from an independent circuit breaker. As with any equipment, using a filter or surge suppressor is recommended.

## Equipment Checklist

After unpacking the TigerSwitch 10/100, check the contents to be sure you have received all the components. Then, before beginning the installation, be sure you have all other necessary installation equipment.

### Package Contents

- ◆ TigerSwitch 10/100 unit, SMC6724L3
- ◆ Four adhesive foot pads
- ◆ Bracket Mounting Kit containing two brackets and four screws for attaching the brackets to the switch
- ◆ Power Cord—either US, Continental Europe or UK
- ◆ RS-232 console cable
- ◆ This Installation Guide
- ◆ Management Guide
- ◆ SMC Warranty Registration Card—be sure to complete and return to SMC

### Optional Rack-Mounting Equipment

If you plan to rack-mount the switch, be sure to have the following equipment available:

- ◆ Four mounting screws for each device you plan to install in a rack—these are not included
- ◆ A screwdriver (Phillips or flathead, depending on the type of screws used)



# Mounting

A TigerSwitch 10/100 unit can be mounted in a standard 19-inch equipment rack or on a desktop or shelf. Mounting instructions for each type of site follow.

**Installing Optional Modules:** Before mounting the switch, be sure you install any optional modules. If you have purchased optional slide-in 1000BASE-T, 100BASE-FX, or 1000BASE-X (GBIC) media expansion modules, install these modules now, following the instructions "Installing an Optional Module into the Switch" on page 3-4.

## Rack Mounting

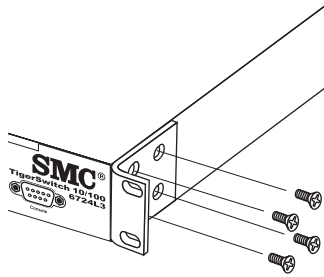
Before rack mounting the switch, pay particular attention to the following factors:

- ◆ **Temperature:** Since the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range. (See page C-2.)
- ◆ **Mechanical Loading:** Do not place any equipment on top of a rack-mounted unit
- ◆ **Circuit Overloading:** Be sure that the supply circuit to the rack assembly is not overloaded.
- ◆ **Grounding:** Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains.

## INSTALLING THE SWITCH

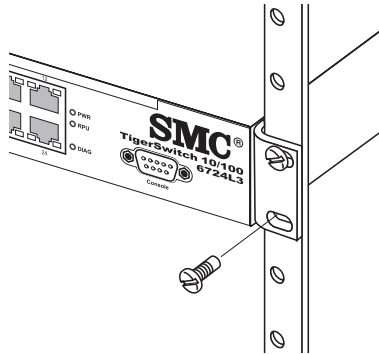
To rack-mount devices:

1. Attach the brackets to the device using the screws provided in the Bracket Mounting Kit.



**Figure 3-1. Attaching the Brackets**

2. Mount the device in the rack, using four rack-mounting screws (not provided).

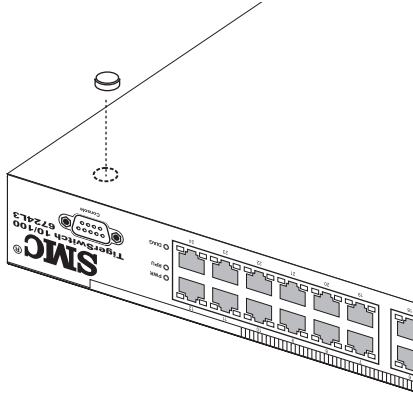


**Figure 3-2. Installing the Switch in a Rack**

3. If installing a single switch only, turn to “Connecting to a Power Source” at the end of this chapter.
4. If installing multiple switches, mount them in the rack, one below the other, in any order.

## Desktop or Shelf Mounting

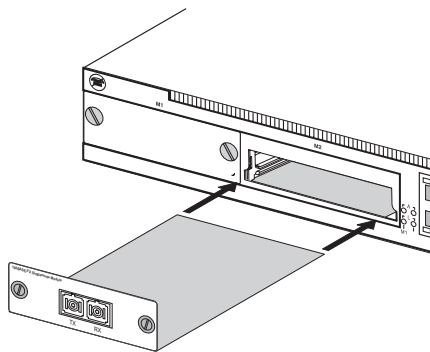
1. Attach the four adhesive feet to the bottom of the first switch.



**Figure 3-3. Attaching the Adhesive Feet**

2. Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper air flow.
3. If installing a single switch only, go to “Connecting to a Power Source” at the end of this chapter.
4. If installing multiple switches, attach four adhesive feet to each one. Place each device squarely on top of the one below, in any order.

## Installing an Optional Module into the Switch



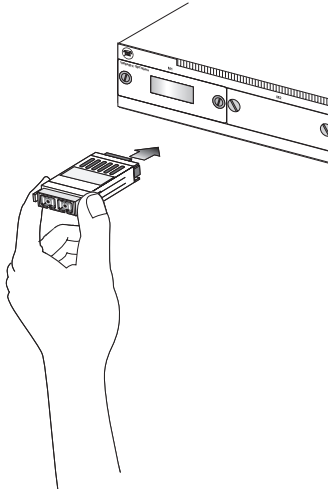
**Figure 3-4. Installing an Optional Module**

**Caution:** DO NOT install slide-in modules with the switch powered on. Be sure you power off the switch before installing any module.

To install an optional module into the switch, do the following:

1. Disconnect power to the switch.
2. Remove the blank metal plate (or a previously installed module) from the appropriate slot by removing the two screws with a flat-head screwdriver.
3. Before opening the package that contains the module, touch the bag to the switch casing to discharge any potential static electricity. Also, it is recommended to use an ESD wrist strap during installation.
4. Remove the module from the anti-static shielded bag.
5. Holding the module level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.

## Installing a GBIC Transceiver



**Figure 3-5. Installing a GBIC Transceiver**

You can install a GBIC transceiver as described below:

1. Insert the transceiver with the SC connector facing out toward you.  
Note that the transceiver is keyed so that it can only be installed in one orientation.
2. Press in on the transceiver's side tabs, and gently slide it into the GBIC interface slot until it clicks into place.

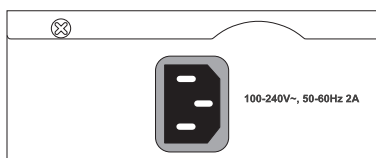
**Caution:** GBIC transceivers are hot-swappable. You do not need to power off the switch before installing or removing a transceiver.

**Note:** Install only 5 V GBIC transceivers into the module slots.

## Connecting to a Power Source

To connect a device to a power source:

1. Insert the power cable plug directly into the receptacle located at the back of the device.



**Figure 3-6. Power Receptacle**

2. Plug the other end of the cable into a grounded, 3-pin socket.

**Note:** For International use, you may need to change the AC line cord. You must use a line cord set that has been approved for the receptacle type in your country.

3. Check the front-panel LEDs as the device is powered on to be sure the Power LED is lit. If not, check that the power cable is correctly plugged in.
4. If you have purchased a Redundant Power Unit, connect it to the device and to an AC power source now, following the instructions included with the package.

# CHAPTER 4

## MAKING NETWORK CONNECTIONS

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### Connecting Network Devices

The TigerSwitch 10/100 may be connected to 10 or 100 Mbps network cards in PCs and servers, as well as to hubs and switches. It may also be connected to remote devices using the optional fiber optic modules

### Twisted-Pair Devices

Each device requires a shielded or unshielded twisted-pair (STP or UTP) cable with RJ-45 connectors at both ends. For 1000BASE-T connections, Category 5, 5e, or 6 cable is required, for 100BASE-TX Category 5 cable is required; for 10BASE-T, Category 3 or better cable can be used.

### Cabling Guidelines

A twisted-pair connection between two ports must have a crossover of the transmit and receive wires to be able to function. This crossover can be implemented in either of the ports, or in the cable connecting them.

Network card ports in PCs and servers do not contain an internal wiring crossover, these are known as straight-through (MDI) ports. Therefore, most switch and hub ports implement a built-in crossover - known as fixed crossover (MDI-X) ports - so that they can be connected to PCs and servers using standard straight-through cable. Some switches and hubs also have an MDI port, so that they can connect to another switch's/hub's

MDI-X port using straight-through cable. To connect between two switches/hubs that only have fixed MDI-X ports, the wiring crossover must be implemented in the cable - known as a crossover cable.

The RJ-45 ports on the switch base unit support automatic MDI/MDI-X operation, which means that they automatically detect the wiring in the link and configure as MDI or MDI-X accordingly. So for these ports, you can use standard straight-through twisted-pair cables to connect to any other network device (PCs, servers, switches, hubs, or routers). However, note that auto-negotiation must be enabled on these ports for automatic wiring configuration to function properly.

See Appendix B for further information on cabling.

## Connecting to PCs, Servers, Hubs and Switches



**Caution:** Do not plug a phone jack connector into an RJ-45 port. This will damage the switch. Use only twisted-pair cables with RJ-45 connectors that conform to FCC standards.

1. Attach one end of a twisted-pair cable segment to the device's RJ-45 connector.

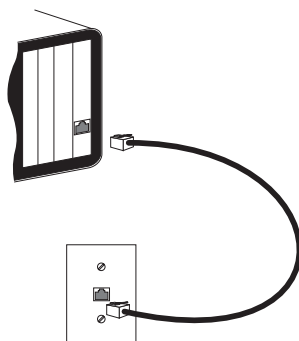


Figure 4-1. Making Twisted-Pair Connections



2. If the device is a PC card and the switch is in the wiring closet, attach the other end of the cable segment to a modular wall outlet that is connected to the wiring closet. (See “Wiring Closet Connections” on the next page.) Otherwise, attach the other end to an available port on the switch.
3. Make sure each twisted pair cable does not exceed 100 meters (328 ft) in length.

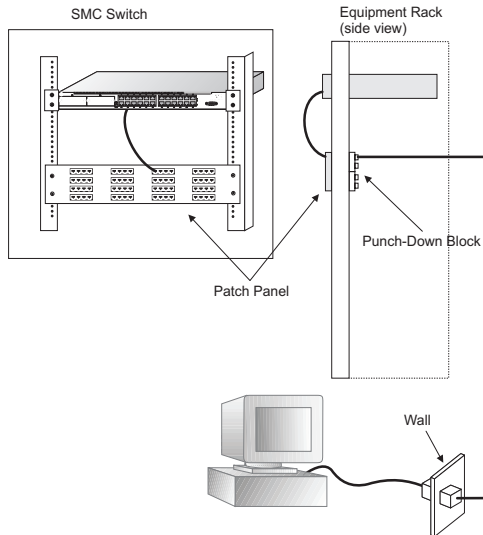
**Note:** When connected to a shared collision domain (such as a hub with multiple workstations), switch ports must be set to half-duplex mode.

4. As each connection is made, the Link LED (on the switch) corresponding to each port will light to indicate that the connection is valid.

## Wiring Closet Connections

Today, the punch-down block is an integral part of many of the newer equipment racks. It is actually part of the patch panel. Instructions for making connections in the wiring closet with this type of equipment follows.

1. Attach one end of a patch cable to an available port on the switch, and the other end to the patch panel.
2. If not already in place, attach one end of a cable segment to the back of the patch panel where the punch-down block is located, and the other end to a modular wall outlet.
3. Label the cables to simplify future troubleshooting.



**Figure 4-2. Wiring Closet Connections**

## Fiber Optic Devices

An optional slide-in 100BASE-FX module may be used for backbone or long-distance connections. The 1000BASE-X slide-in GBIC support module may be used in conjunction with a 1000BASE-SX, 100BASE-LX, or 1000BASE-ZX GBIC transceiver for high-speed and long-distance connections from 550 meters to 100 kilometers.

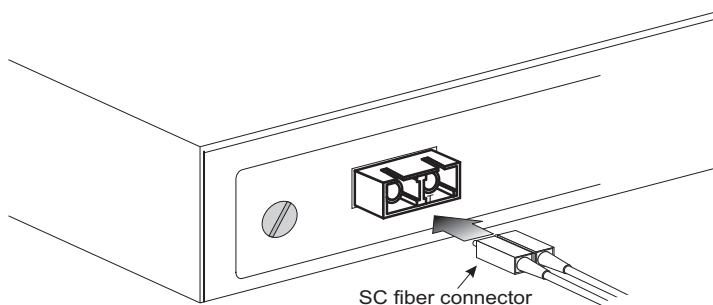
Each multimode fiber optic port requires 50/125 or 62.5/125 micron multimode fiber optic cabling with an SC connector at both ends. If you need to connect to a device with 62.5/125 micron cable that has ST-type connectors, SMC provides an optional SC-ST Converter (Part Number: 99-012034-091).

Each single-mode fiber port requires 9/125 micron single-mode fiber optic cable with an SC connector at both ends.

**Warning:** This switch uses lasers to transmit signals over fiber optic cable. The lasers are compliant with the requirements of a Class 1 Laser Product and are inherently eye safe in normal operation. However, you should never look directly at a transmit port when it is powered on.

1. Remove and keep the SC port's rubber cover. When not connected to a fiber cable, the rubber cover should be replaced to protect the optics.
2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.

3. Connect one end of the cable to the SC port on the switch and the other end to the SC port on the other device. Since SC connectors are keyed, the cable can be attached in only one orientation.



**Figure 4-3. Making SC Port Connections**

4. As a connection is made, check the Activity LED on the switch's front panel for the corresponding module to be sure that the connection is valid.

**Note:** If you use the optional SC-ST Converter, be sure to connect the converter's Tx (Rx) port to the Rx (Tx) port on the other device.

# APPENDIX A

## TROUBLESHOOTING

---

### Diagnosing Switch Indicators

Troubleshooting Chart	
Symptom	Action
PWR LED is Off	<ul style="list-style-type: none"><li>• Internal power supply has failed or is disconnected.</li><li>• Check connections between the switch, the power cord, and the wall outlet.</li><li>• Contact SMC Technical Support.</li></ul>
Link LED is Off	<ul style="list-style-type: none"><li>• Verify that the switch and attached device are powered on.</li><li>• Be sure the cable is plugged into both the switch and corresponding device.</li><li>• If the switch is installed in a rack, check the connections to the punch-down block and patch panel.</li><li>• Verify that the proper cable type is used and its length does not exceed specified limits.</li><li>• Check the adapter on the attached device and cable connections for possible defects. Replace the defective adapter or cable if necessary.</li></ul>

## Power and Cooling Problems

If the power indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet or DC power adapter.

However, if the unit powers off after running for a while, check for loose power connections, power losses or surges at the power outlet. If you still cannot isolate the problem, then the internal power supply may be defective.

## Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

## In-Band Access

You can access the management agent in the switch from anywhere within the attached network using Telnet, a Web browser, or other network management software such as EliteView. However, you must first configure the switch with a valid IP address, subnet mask, and default gateway. If you have trouble establishing a link to the management agent, check to see if you have a valid network connection. Then verify that you entered the correct IP address. Also, be sure the port through which you are connecting to the switch has not been disabled. If it has not been disabled, then check the network cabling that runs between your remote location and the switch.

**Note:** The management agent accepts up to four simultaneous Telnet sessions. If the maximum number of sessions already exists, an additional Telnet connection will not be able to log into the system.

# APPENDIX B

## CABLES

---

### Specifications

Cable Types and Specifications			
Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3 or better 100-ohm UTP	100 m (328 ft)	RJ-45
100BASE-TX	Cat 5 or better 100-ohm UTP	100 m (328 ft)	RJ-45
100BASE-FX	50/125 or 62.5/125 micron core multimode fiber (MMF)	2 km (1.24 miles)	SC or SC-ST
100BASE-FX	9/125 micron core single-mode fiber (SMF)	20 km (12.43 miles)	SC
1000BASE-SX	50/125 or 62.5/125 micron core MMF	See the following table	SC or SC-ST
1000BASE-LX	9/125 micron SMF	10 km (6.2 miles)	SC
1000BASE-ZX	9/125 micron SMF	70 - 100 km (43.5 - 62.1 miles)	SC
1000BASE-T	Cat. 5, 5e 100-ohm UTP	100 m (328 ft)	RJ-45

1000BASE-SX Fiber Specifications		
Fiber Diameter	Fiber Bandwidth	Maximum Cable Length
62.5/125 micron MMF	160 MHz/km	2-220 m (7-722 ft)
	200 MHz/km	2-275 m (7-902 ft)
50/125 micron MMF	400 MHz/km	2-500 m (7-1641 ft)
	500 MHz/km	2-550 m (7-1805 ft)

Maximum Fiber Optic Cable Distance for 1000BASE-LX		
Fiber Size	Fiber Bandwidth	Maximum Cable Length
9/125 micron	N/A	2 m - 10 km (7 - 32808 ft)

Maximum 1000BASE-ZX Fiber Optic Cable Distance		
Fiber Diameter	Fiber Bandwidth	Cable Length Range
9/125 micron single-mode fiber (SMF)	N/A	70* - 100 km (43.5 - 62.1 miles)

\* For link spans exceeding 70 km, you may need to use premium single mode fiber or dispersion shifted single mode fiber.

**Note:** If you need to connect to a device with 62.5/125 micron cable that has ST-type connectors, SMC provides an optional SC-ST Converter (Part Number: 99-012034-091).

## Twisted-Pair Cable and Pin Assignments

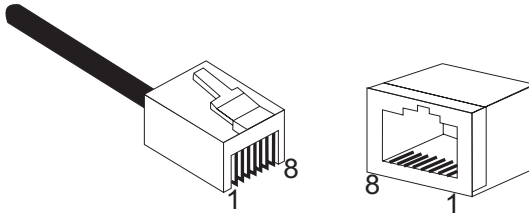
**Caution:** DO NOT plug a phone jack connector into any RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

For 100BASE-TX/10BASE-T connections, a twisted-pair cable must have two pairs of wires. Each wire pair is identified by two different colors. For example, one wire might be green and the other, green with white stripes. Also, an RJ-45 connector must be attached to both ends of the cable.

**Caution:** Each wire pair must be attached to the RJ-45 connectors in a specific orientation. (See “Cabling Guidelines” on page 4-1 for an explanation.)

Figure B-1 illustrates how the pins on the RJ-45 connector are numbered. Be sure to hold the connectors in the same orientation when attaching the wires to the pins.



**10BASE-T/100BASE-TX Pin Assignments****Figure B-1. RJ-45 Connector Pin Numbers**

Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for RJ-45 connections: 100-ohm Category 3, 4 or 5 cable for 10 Mbps connections or 100-ohm Category 5 cable for 100 Mbps connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

The RJ-45 ports on the switch base unit support automatic MDI/MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. In straight-through cable, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1, 2, 3, and 6 at the other end of the cable. When using any RJ-45 port on this switch, you can use either straight-through or crossover cable.

Pin	MDI-X Assignment	MDI Assignment
1	Input Receive Data +	Output Transmit Data +
2	Input Receive Data -	Output Transmit Data -
3	Output Transmit Data +	Input Receive Data +
6	Output Transmit Data -	Input Receive Data -
4,5,7,8	Not used	Not used

**Note:** The "+" and "-" signs represent the polarity of the wires that make up each wire pair.

Straight-Through Wiring

If the twisted-pair cable is to join two ports and only one of the ports has an internal crossover (MDI-X), the two pairs of wires must be straight-through. (When auto-negotiation is enabled for any RJ-45 port on this switch, you can use either straight-through or crossover cable to connect to any device type.)

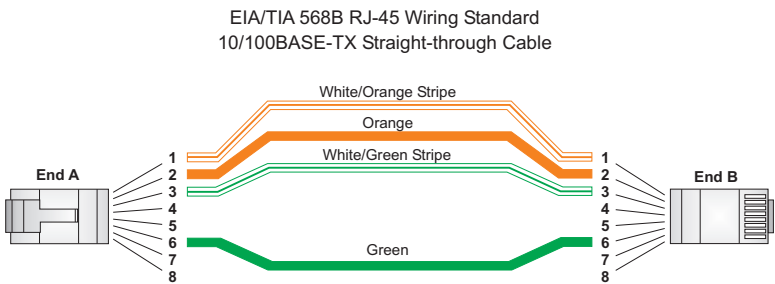


Figure B-2. Straight-through Wiring

Crossover Wiring

If the twisted-pair cable is to join two ports and either both ports are labeled with an “X” (MDI-X) or neither port is labeled with an “X” (MDI), a crossover must be implemented in the wiring. (When auto-negotiation is enabled for any RJ-45 port on this switch, you can use either straight-through or crossover cable to connect to any device type.)

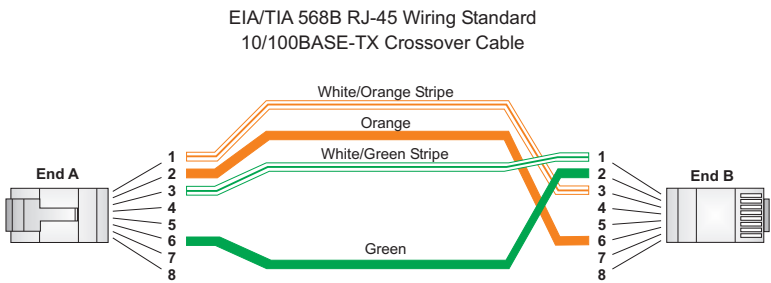


Figure B-3. Crossover Wiring

## 1000BASE-T Pin Assignments

All 1000BASE-T ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs.

The table below shows the 1000BASE-T MDI and MDI-X port pinouts. These ports require that all four pairs of wires be connected. Note that for 1000BASE-T operation, all four pairs of wires are used for both transmit and receive.

Use 100-ohm Category 5, 5e or 6 unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for 1000BASE-T connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

1000BASE-T MDI and MDI-X Port Pinouts		
Pin	MDI Signal Name	MDI-X Signal Name
1	Bi-directional Data One Plus (BI_D1+)	Bi-directional Data Two Plus (BI_D2+)
2	Bi-directional Data One Minus (BI_D1-)	Bi-directional Data Two Minus (BI_D2-)
3	Bi-directional Data Two Plus (BI_D2+)	Bi-directional Data One Plus (BI_D1+)
4	Bi-directional Data Three Plus (BI_D3+)	Bi-directional Data Four Plus (BI_D4+)
5	Bi-directional Data Three Minus (BI_D3-)	Bi-directional Data Four Minus (BI_D4-)
6	Bi-directional Data Two Minus (BI_D2-)	Bi-directional Data One Minus (BI_D1-)
7	Bi-directional Data One Plus (BI_D4+)	Bi-directional Data One Plus (BI_D3+)
8	Bi-directional Data Four Minus (BI_D4-)	Bi-directional Data Three Minus (BI_D3-)

## 1000BASE-T Cable Requirements

All Category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected. However, it is recommended that for all critical connections, or any new cable installations, Category 5e (enhanced Category 5) or 6 cable should be used. The Category 5e and 6 specifications include test parameters that are only recommendations for Category 5. Therefore, the first step in preparing existing Category 5 cabling for running 1000BASE-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3ab standards.

## Cable Testing for Existing Category 5 Cable

Installed Category 5 cabling must pass tests for Attenuation, Near-End Crosstalk (NEXT), and Far-End Crosstalk (FEXT). This cable testing information is specified in the ANSI/TIA/EIA-TSB-67 standard. Additionally, cables must also pass test parameters for Return Loss and Equal-Level Far-End Crosstalk (ELFEXT). These tests are specified in the ANSI/TIA/EIA-TSB-95 Bulletin, "The Additional Transmission Performance Guidelines for 100 Ohm 4-Pair Category 5 Cabling."

**Note:** When testing your cable installation, be sure to include all patch cables between switches and end devices.

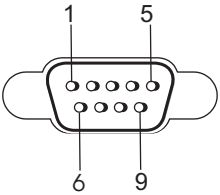
## Adjusting Existing Category 5 Cabling

If your existing Category 5 installation does not meet one of the test parameters for 1000BASE-T, there are basically three measures that can be applied to try to correct the problem:

1. Replace any Category 5 patch cables with high-performance Category 5e or 6 cables.
2. Reduce the number of connectors used in the link.
3. Reconnect some of the connectors in the link.

# Console Port Pin Assignments

The DB-9 serial port on the switch's front panel is used to connect to the switch for out-of-band console configuration. The on-board menu-driven configuration program can be accessed from a terminal or a PC running a terminal emulation program. The pin assignments used to connect to the serial port are provided in the following tables.



**Figure B-4. Serial Port (DB-9 DCE) Pin-Out**

## Wiring Map for Serial Cable

Signal (serial port)	Pin	Signal (management console port)
Unused	1	Unused
TXD (transmit data)	2	RXD (receive data)
RXD (receive data)	3	TXD (transmit data)
Unused	4	Unused
GND (ground)	5	GND (ground)
Unused	6	Unused
CTS (clear to send)	7	RTS (request to send)
RTS (request to send)	8	CTS (clear to send)
Unused	9	Unused

The left hand column pin assignments are for the male DB-9 connector. Pin 2 (TXD or “transmit data”) must emerge on the management console’s end of the connection as RXD (“receive data”). Pin 7 (CTS or “clear to send”) must emerge on the management console’s end of the connection as RTS (“request to send”).

The serial port's configuration requirements are as follows:

- Default Baud rate—9,600 Bps.
- Parity—None.
- Stop bit—One.
- Data bits—8.

# APPENDIX C

## SPECIFICATIONS

---

### Physical Characteristics

#### Base Unit

##### Ports

24 10BASE-T/100BASE-TX, with auto-negotiation

##### Media Slot

2 slots for optional 100BASE-FX, 1000BASE-T and 1000BASE-X (GBIC)

##### Network Interface

10BASE-T: RJ-45 (100-ohm, UTP cable; Categories 3, 4, 5)

100BASE-TX: RJ-45 (100-ohm, UTP cable; Category 5)

Ports 1-24: RJ-45 connectors, auto MDI/MDI-X

##### Communication Speed

10 and 100 Mbps

##### Communication Mode

Full and half duplex

##### Buffer Architecture

8 Mbyte per system

##### Aggregate Bandwidth

8.8 Gbps

##### Switching Database

8K MAC address entries

2K IP address entries

## *SPECIFICATIONS*

### **LEDs**

System: PWR, RPU, Diag

Port: Link/Activity

### **Weight**

5.0 kg (11.02 oz)

### **Size**

44.0 x 41.0 x 4.4 cm (17.4 x 17.3 x 1.7 in.)

### **Temperature**

Operating: 0 to 50 °C (32 to 122 °F)

Storage: -40 to 70 °C (-40 to 158 °F)

### **Humidity**

Operating: 5% to 95%

### **Power Supply**

Internal, auto-ranging transformer: 100 to 240 VAC, 50 to 60 Hz

### **Power Consumption**

70 Watts maximum

### **Maximum Current**

1.2 A @ 110 VAC

0.6 A @ 240 VAC

## **Compliances**

### **CE Mark**

### **Emissions**

FCC Class A

Industry Canada Class A

EN55022 (CISPR 22) Class A

EN 61000-3-2/3

VCCI Class A

C-Tick - AS/NZS 3548 (1995) Class A



**Immunity**

EN 61000-4-2/3/4/5/6/8/11

**Safety**

CSA/NRTL (CSA 22.2.950 & UL 1950)

EN60950 (TÜV/GS)

## Warranty

Limited Lifetime

## Slide-in Modules

### 100BASE-FX Extender Modules

**Models**

SMC6824FSSC, SMC6824FMSC

**Ports**

1 100BASE-FX, SC connectors

**Communication Speed**

100 Mbps

**Communication Mode**

Full duplex

**Network Interface**

SMC6824FSSC

9/125 micron single-mode fiber cable

SMC6824FMSC

50/125 or 62.5/125 micron multimode fiber cable

**Standards**

IEEE 802.3u Fast Ethernet

ISO/IEC 8802-3

**Weight**

50 g (1.8 oz)

**Size**

11.0 x 7.3 cm (4.3 x 2.87 in.)

**1000BASE-T Extender Module**

**Model**

SMC6824GT

**Ports**

1 1000BASE-T, RJ-45 connector

**Communication Speed**

10/100/1000 Mbps

**Communication Mode**

Full duplex only at 1000 Mbps

Full and half duplex at 10/100 Mbps

**Network Interface**

RJ-45 (100-ohm, UTP cable; Category 5, 5e, or 6)

**Standards**

IEEE 802.3ab Gigabit Ethernet

IEEE 802.3u Fast Ethernet

IEEE 802.3 Ethernet

**Weight**

55 g (1.9 oz)

**Size**

11.0 x 7.3 cm (4.3 x 2.87 in.)

## **1000BASE-X GBIC Module**

**Model**

SMC6824GB

**Ports**

1 slot for GBIC transceivers

**Communication Speed**

1000 Mbps

**Communication Mode**

Full Duplex

**Standards**

IEEE 802.3z Gigabit Ethernet

**Weight**

70 g (2.5 oz)

**Size**

11.0 x 7.3 cm (4.3 x 2.87 in.)

## *SPECIFICATIONS*

# APPENDIX D

## ORDERING INFORMATION

---

TigerSwitch 10/100 Products and Accessories	
Product Number	Description
SMC6724L3	24-port Layer 3 switch with two media expansion slots
SMC6824GT	Gigabit module with one 10/100/1000BASE-T port (RJ-45 connector)
SMC6824FSSC	Extender module with one 100BASE-FX single-mode fiber port (SC-type connector)
SMC6824FMSC	Extender module with one 100BASE-FX multimode fiber port (SC-type connector)
SMC6824GB	Gigabit module with one slot for GBIC transceivers
SMCRPU600W	Redundant power unit with cables, supports one device
SMCBGSSCX1	1-port 1000BASE-SX GBIC transceiver
SMCBGLSCX1	1-port 1000BASE-LX GBIC transceiver
SMCBGZSCX1	1-port 1000BASE-ZX GBIC transceiver
99-012034-091	SC to ST plug converter for fiber optic module

## *ORDERING INFORMATION*

# GLOSSARY

## **10BASE-T**

IEEE 802.3 specification for 10 Mbps Ethernet over two pairs of Category 3, 4, or 5 UTP cable.

## **100BASE-TX**

IEEE 802.3u specification for 100 Mbps Fast Ethernet over two pairs of Category 5 UTP cable.

## **100BASE-FX**

IEEE 802.3u specification for 100 Mbps Fast Ethernet over two strands of 50/125 or 62.5/125 micron core fiber cable.

## **1000BASE-SX**

IEEE 802.3z specification for Gigabit Ethernet over two strands of 50/125 or 62.5/125 micron core fiber cable.

## **1000BASE-LX**

IEEE 802.3z specification for Gigabit Ethernet over two strands of 9/125 micron core fiber cable.

## **1000BASE-T**

IEEE 802.3ab specification for Gigabit Ethernet over two pairs of Category 5, 5e, or 6 100-ohm UTP cable.

## **1000BASE-ZX**

Specification for long-haul Gigabit Ethernet over two two strands of 9/125 micron core fiber cable.

**Auto-Negotiation**

Signalling method allowing each node to select its optimum operational mode (e.g., 10, 100, or 1000 Mbps and half or full duplex) based on the capabilities of the node to which it is connected.

**Bandwidth**

The difference between the highest and lowest frequencies available for network signals. Also synonymous with wire speed, the actual speed of the data transmission along the cable.

**Collision**

A condition in which packets transmitted over the cable interfere with each other. Their interference makes both signals unintelligible.

**Collision Domain**

Single CSMA/CD LAN segment.

**CSMA/CD**

Carrier Sense Multiple Access/Collision Detect is the communication method employed by Ethernet and Fast Ethernet.

**End Station**

A workstation, server, or other device that does not act as a network interconnection.

**Ethernet**

A network communication system developed and standardized by DEC, Intel, and Xerox, using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model and extends the physical layer and media with repeaters and implementations that operate on fiber, thin coax and twisted-pair cable.



**Fast Ethernet**

A 100 Mbps network communication system based on Ethernet and the CSMA/CD access method.

**Fast Ethernet Switch**

Device that provides a full 100 Mbps bandwidth (or either 10 or 100 Mbps bandwidth with Auto-Negotiation) to each port (LAN segment).

**Full Duplex**

Transmission method that allows switch and network card to transmit and receive concurrently, effectively doubling the bandwidth of that link.

**Gigabit Ethernet**

A 1000 Mbps network communication system based on Ethernet and the CSMA/CD access method.

**IEEE 802.3**

Defines carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

**IEEE 802.3ab**

Defines CSMA/CD access method and physical layer specifications for 1000BASE-T Gigabit Ethernet.

**IEEE 802.3u**

Defines CSMA/CD access method and physical layer specifications for 100BASE-TX and 100BASE-FX Fast Ethernet.

**IEEE 802.3x**

Defines Ethernet frame start/stop requests and timers used for flow control on full-duplex links.

**IEEE 802.3z**

Defines CSMA/CD access method and physical layer specifications for 1000BASE Gigabit Ethernet.

**LAN Segment**

Separate LAN or collision domain.

**LED**

Light emitting diode used for monitoring a device or network condition.

**Link Segment**

Length of twisted-pair or fiber cable joining a pair of repeaters or a repeater and a PC.

**Local Area Network (LAN)**

A group of interconnected computer and support devices.

**Media Access Control (MAC)**

A portion of the networking protocol that governs access to the transmission medium, facilitating the exchange of data between network nodes.

**MIB**

An acronym for Management Information Base. It is a set of database objects that contains information about the device.

**MII**

Media Independent Interface, the standard interface for Fast Ethernet—similar to the AUI interface for traditional Ethernet.

**Network Diameter**

Wire distance between two end stations in the same collision domain.

**RJ-45 Connector**

A connector for twisted-pair wiring.

**Straight-through Port**

An RJ-45 port which does not cross the receive and transmit signals internally so it can be connected with straight-through twisted-pair cable to any device having a crossover port. Also referred to as a “Daisy-Chain” port.

**Switched Ports**

Ports that are on separate collision domains or LAN segments.  
Transmission Control Protocol/Internet Protocol (TCP/IP)  
Protocol suite that includes TCP as the primary transport protocol, and IP as the network layer protocol.

**UTP**

Unshielded twisted-pair cable.



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North West Africa:	34 93 477 4920;	Fax 34 93 477 3774
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PRC:	86-10-6235-4958;	Fax 86-10-6235-4962
Taiwan:	886-2-8797-8006;	Fax 886-2-8797-6288
Asia Pacific:	(65) 238 6556;	Fax (65) 238 6466
Korea:	82-2-553-0860;	Fax 82-2-553-7202
Japan:	81-45-224-2332 ;	Fax 81-45-224-2331
Australia:	61-2-8875-7887;	Fax 61-2-8875-7777
India:	91-22-8204437 ;	Fax 91-22-8204443

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